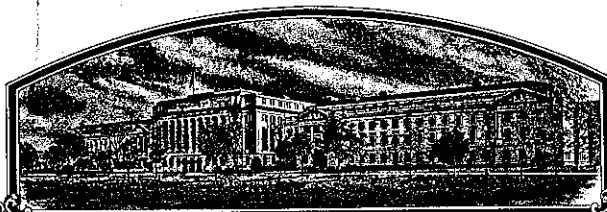


No.



8500098

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Quality Research Associates

Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY, AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (U.S.C. 3151, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'Q381'



Attest

Kenneth H. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington
this 29th day of November in
the year of our Lord one thousand nine
hundred and eighty-five.

John R. Bush
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0005

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1. NAME OF APPLICANT(S) Quality Research Associates		2. TEMPORARY DESIGNATION Q381		3. VARIETY NAME Q381	
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) P.O. Box 99 Olivia, Minnesota 56277		5. PHONE (Include area code) 612 523-5120		FOR OFFICIAL USE ONLY PVPO NUMBER 8500098	
6. GENUS AND SPECIES NAME Zea Mays		7. FAMILY NAME (Botanical) Gramineae		FILING DATE 4/1/85 TIME 2:30 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.	
8. KIND NAME Corn - Dent Inbred		9. DATE OF DETERMINATION Dec. 1982		AMOUNT FOR FILING \$ 1,800.00 DATE 4/1/85	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Partnership				AMOUNT FOR CERTIFICATE \$ 200.00 DATE 11/7/85	
11. IF INCORPORATED, GIVE STATE OF INCORPORATION				12. DATE OF INCORPORATION	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Quality Research Associates P.O. Box 99 Olivia, Minnesota 56277					
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED					
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)		c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.)			
b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement		d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of the Variety			
		e. <input checked="" type="checkbox"/> EXHIBIT E, OWNERSHIP STATEMENT R/S			
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> Foundation <input type="checkbox"/> Registered <input type="checkbox"/> Certified					
18. DID THE APPLICANT(S) FILE FOR PROTECTION OF THE VARIETY IN THE U.S. OR OTHER COUNTRIES? France Application sent March 20, 1985 <input checked="" type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input type="checkbox"/> No					
19. HAVE RIGHTS BEEN GRANTED IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No					
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF APPLICANT Quality Research Associates By <i>George K. Luck</i>				DATE 3/27/85	
SIGNATURE OF APPLICANT <i>M. J. Madison</i>				DATE 3/27/85	

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EXHIBIT A

14A Origin and Breeding History of the Variety Q381

1969 One off-type plant was observed in a test plot planting of
Pioneer 3369 at Scott City, Kansas. The plant was selfed and the
seed saved.

1970 The seed was selfed and observed.

1971 }
1972 } Selfed and observed - ear to row for selection.
1973 }
1974 }

1975 }
1976 } Top crossed on various lines and observed, for best combining
1977 } ability , showed promise of improved ear retention and good
1978 } combining ability.

1979 Selected #79 - 328 and #79 - 329 as most uniform of selections

1980 79 - 328 and 79 - 329 recombined and increased

1981 Entered in testing program, with improved ear retention evident
with good combining abilities, and contributing positive yield factors.

1982 Repeat of 1981.

1983 Increased quantities of seed for pilot production.

1984 Pilot production quantities for wide testing - and increased seed.

Q381 appears to be stable and exhibits no further segregation.

8500098

July 8, 1985

App. # 8500098

EXHIBIT A SUPPLEMENT

- 1980 Year of generation increase occurred. Row 79-328 and 79-329 were bulked into a composite and increased with no visible variants at which time we felt we had a pure line expressing uniform plant characteristics including silk coloration.
- 1981 Line was examined again for uniformity and entered into a testing program.
- 1982 Line was again examined for uniformity with no variants occurring and tested again over a wider area.
- 1983 The first year of block production we increased a 1 acre block of Q381 which we used for pilot production of experimental hybrids in 1984.
- 1984 We again increased the line for additional pilot production for wide area testing.
- 1985 We currently have 12 acres of Q381 growing in an increase block for potential commercial production use next year.

Since 1982 we have found no variants occurring in the inbred line other than the occasional outcross due from contamination. These have occurred less than .001 percent. To verify this; attached is a copy of the 1983 field inspection report from Minnesota Crop Improvement stating uniformity on each inspection.

MINNESOTA CROP IMPROVEMENT ASSOCIATION
FIELD INSPECTION REPORT

App. # 8500098

EXHIBIT A SUPPORT

Member No. 3099 Field No. 2
Applicant Quality Genetics Association Variety 381 inbred Corn Code 3082
Address Box 79, Olivia, Mo. Acres 1
Grower Milo Madison Previous Crop Soybeans
Is Isolation Satisfactory? Yes ☐ No ☒ Seed Class: (Check) F ☒ R ☐ C ☐

Number Per Sample (Sample Size _____)

Factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	%		
Other Varieties																								
July 26	No seed. - Corns emerging. Just shedding leaves.																							
July 29	Trace of seed. - Corns black. No leaves.																							
Aug 2	50% black - shattering, mostly. - Uniform - 14 in. tall. 4 ft.																							
Aug 5	100% black. - Uniform. - 14 in. tall. 4 ft.																							
Aug 8	100% black. - Uniform. - 14 in. tall. 4 ft.																							
Maturity	Pollination										General Appearance										Good		14 in. tall	
Other Crops (Kind and Amount)																								

Weeds (Kind and Amount)

Common _____

Restricted _____

Prohibited _____

Field Classification: (Check)

X

Subject to harvest inspection for isolation

Passed, OECD Only

Rejected, Subject to Application for Reinspection by _____

date

Rejected

NOTE: For rejected fields, an applicant desiring reinspection must notify inspector when corrections have been made and reinspection is desired.
An extra charge will be made for reinspections.

Corrections required, reason for rejection, special problems or remarks:

Trace of black from harvest

12 rows on W side for isolation

Call Earl Holschauer for harvest inspection

Check if applicable: ☐ This is a reinspection, special fee is to be charged.

Date

8/8/83

Inspector

L. A. Holschauer

APPLICANT: Take this report to seed plant when delivering seed for processing.

SUPPLEMENT TO EXHIBIT B

July 8, 1985
App. # 8500098

As per your explanation in paragraph (2) the most similar previously existing variety with which we have access is MBS847, a private inbred, sold by Mike Brayton Seeds of Ames, Iowa.

The accompanying data sheets show the existing differences as we evaluated Q381.

The points of greatest difference are:

1. Uniform silk color
2. Leaf angle
3. Heat units to 90% pollen
4. Heat units to 50% silk
5. Heat units to black layer
6. Seed size

There are many differences of smaller magnitude when you compare all measured traits. To give you comparison means for the data comparison of MBS847 and Q381, I am also attaching the same data from same locations for A632 which is slightly earlier and CB59C which is slightly later.

September 4, 1985

App. # 8500098

SUPPLEMENT TO EXHIBIT B

Comparison of characteristics identifiable and quantifiable for Q381 in relationship to MBS847, using A632 and CB59G as an early and later comparison check.

Inbred lines of dent corn Q381, MBS847, A632 and CB59G were among 20 different inbreds grown in (8) unique replicated trials at 5 locations across the corn belt in 1984 to evaluate their relative usefulness as inbred lines for production of commercial hybrids. The 5 locations were; Central Minnesota, East Central Nebraska, Central Iowa, North East Colorado, East Central Illinois.

The comparisons were made in randomized complete block designs with four replications per each test. At three of the five locations where tests were conducted, both an early and a late planting date were utilized, thus accounting for the eight separate comparisons.

Planting rates, fertilizers, herbicides and other management practices varied from location to location being consistent with normal management practices in the growing area. Traits evaluated in each experiment were days to 50% pollen shed and silk emergence, days to black layer, seedling vigor, rated visually on a 9 (best) to 1 (poorest) scale, average plant and ear height, final stand, percent of plants with stalk and root lodging and dropped ears at harvest, ear length, kernel row number per ear, percent moisture at harvest, grain yield and potential useable seed by 64ths using hand screens. Pollen and silking dates as well as black layer maturity dates were summarized, according to calendar days after emergence rather than heat unit accumulation, because high and low temperature data were not available from all locations where tests were grown.

Quantitative traits were analyzed statistically both within and across experiments. Across location averages of each inbred were compared by using the location times inbred mean square from the analysis of variance as the error term for calculation of the standard errors.

8500098

Results:

Contrasts of several morphological characteristics of Q381 with MBS847, A632, and CB59G are presented in Table B-1.

Q381 began shedding pollen 2.2, 1.8, and 5.1 days earlier than MBS847, A632, and CB59G, respectively. Q381 began silking 1.0, 1.6, and 3.8 days earlier than MBS847, A632, and CB59G, respectively. Q381 reached black layer maturity 4.4, 5.8 and 7.5 days earlier than MBS847, A632, and CB59G, respectively. All these differences were significant at the 5% level of significance. There were no differences among inbreds for grain moisture percentage at black layer maturity.

Q381 displayed seedling vigor at approximately the 5 leaf stage similar to A632 and CB59G and significantly better than MBS847. Plant height of Q381 was not significantly different than that of MBS847. However, ear node height of Q381 was 2-6 inches taller than MBS847. Plant height of Q381 was about five inches shorter than A632 and CB59G. Ear height of Q381 was about the same as that of A632 but about six inches shorter than CB59G.

Q381 had significantly more kernel rows per ear than MBS847, but significantly less kernel rows than A632. Ear length of Q381 was significantly shorter than that of A632 and CB59G, and similar to MBS847. Grain yield adjusted to 15.5% moisture of the four inbreds was very similar, approximately 60 bushels/acre.

In order to compare the kernel grade-out of Q381 with the other inbreds, seed samples of each inbred were collected from each experiment. Seeds were sized and graded with conventional seed sizing equipment. Kernel frequencies of each inbred in each seed size of either flat or round kernel classes were calculated on a percentage basis (Table B-2). A chi-square square test was used to determine whether the percentage of kernels observed in each flat and round size class was the same as that expected if each of the two inbreds in a comparison had identical kernel size distributions.

The chi-square tests indicated that the frequencies of kernels in each flat and round size of Q381 were not the same as those in MBS847, A632, and CB59G. Those differences were significant at the 0.001 level of significance.

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TABLE B-1

MORPHOLOGICAL CHARACTERISTICS

Q381 Compared To MBS847, A632, and CB59G
In Eight Environments Observed in 1984.

	Days To		Seedling Vigor 9=Best 1=Poorest	Plant Height (inches)	Ear Node Height (inches)	Kernel Rows On Ear	Ear Length (inches)	% Harvest Moisture @ 15.5%	Grain- Yield Bu./Ac. Lodged	% Stalk Lodged	% Root Lodged	% Dropped Ears	Ears Per Plant		
	50% Pollen	50% Silk													
Q381	65.8	68.6	117.3	29.8	6.7	57.5	28.2	14.1	13.2	12.8	59.5	5.3	0.2	0.1	1.2
MBS847	68.0	69.6	121.7	30.9	5.6	56.5	25.6	13.2	13.3	13.2	61.5	5.5	1.0	1.0	1.1
LSD.05	0.8*	0.7*	4.1*	4.2	0.4*	1.4	1.3*	0.9*	1.3	0.6	12.8	5.4	3.2	1.4	0.1
Q381	65.8	68.6	117.3	29.8	6.7	57.5	28.2	14.1	13.2	12.8	59.5	5.3	0.21	0.1	1.2
A632	67.6	70.2	123.1	27.0	6.5	62.2	29.1	15.0	15.4	13.2	60.6	3.7	3.0	0.4	1.1
LSD.05	0.8*	0.7*	4.1*	4.2	0.4	1.4*	1.3	0.9*	1.3*	0.6	12.8	5.4	3.2	1.4	0.1
Q381	65.8	68.6	117.3	29.7	6.7	57.5	28.2	14.1	13.2	12.8	59.5	5.3	0.2	0.1	1.2
CB59C	70.9	72.4	124.8	28.2	6.4	62.9	34.1	13.8	15.1	12.8	60.9	1.3	0.1	0.8	1.2
LSD.05	0.9*	0.6*	2.6*	6.4	0.4	1.9*	1.6*	1.4	1.6*	0.8	7.1	3.8*	3.6	0.8	0.1

* Significantly different at the 0.05 significance level.

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TABLE B-2

8500098

KERNEL GRADE-OUT DISTRIBUTIONS
OF Q381, MBS847, A632, and CB59G

	FLAT										
	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>
Q381	1.43	2.37	5.40	7.59	11.02	11.59	9.90	4.03	1.11	0.14	0.00
MBS847	1.49	2.73	7.08	10.88	14.78	12.22	5.56	1.12	0.11	0.00	0.00
A632	1.43	4.24	10.21	12.66	10.31	4.80	1.67	0.36	0.03	0.02	0.00
CB59G	0.58	0.74	2.04	3.72	6.85	8.72	8.43	4.30	1.64	0.43	0.08

	ROUND												χ^2
	<u>RS</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	
Q381	2.62	1.07	2.35	4.27	6.31	8.92	9.01	7.06	2.94	0.73	0.13	0.00	
MBS847	2.20	1.41	3.33	5.97	8.22	10.15	7.98	3.84	0.80	0.13	0.00	0.00	442.4**
A632	1.15	1.76	5.61	10.76	11.53	11.10	6.84	3.77	1.47	0.23	0.03	0.00	1231.2**
CB59G	1.20	0.39	1.28	3.72	7.30	13.05	14.53	12.57	5.94	1.85	0.51	0.15	625.2**

** Chi-square (χ^2) test indicates that kernel frequencies in each kernel size, class, are significantly different from those of Q381 at the 0.001 significance level.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

FORM APPROVED: OMB NO. 40-R3822

EXHIBIT C
(Corn)

OBJECTIVE DESCRIPTION OF VARIETY
CORN (ZEA MAYS)

NAME OF APPLICANT(S) Quality Research Associates	FOR OFFICIAL USE ONLY PVPO NUMBER 8500038
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) Box 99 Olivia, Minnesota 56277	VARIETY NAME OR TEMPORARY DESIGNATION 381

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g., 0 8 9 or 0 9) when number is either 99 or less or 9 or less.

1. TYPE:

2 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

2 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how heat units were calculated)

6 8	DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK	1 4 1 1	HEAT UNITS
N A	DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY	N A	HEAT UNITS
4 7	DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE (Black Layer)	0 9 7 4	HEAT UNITS

4. PLANT:

1 6 5 CM. HEIGHT (To tassel tip) 0 7 2 CM. EAR HEIGHT (To base of top ear)
1 6 CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

Number of Ears Per Stalk:

1 1 = NONE 2 = 1-2 3 = 2-3 4 = > 3 3 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

1 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify)

5. LEAF (Field Corn Inbred Examples Given):

Color:

2 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K166)

Angle from Stalk (Upper half):

Sheath Pubescence:

1 1 = < 30° 2 = 30-60° 3 = > 60° 1 1 = LIGHT (W22) 2 = MEDIUM (WF9)
3 = HEAVY (OH26)

Marginal Waves:

Longitudinal Creases:

1 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L) 1 1 = ABSENT (OH51) 2 = FEW (OH56A)
3 = MANY (PA11)

Width:

Length:

0 8 CM. WIDEST POINT OF EAR NODE LEAF 0 8 0 CM. EAR NODE LEAF
1 2 NUMBER OF LEAVES PER MATURE PLANT

8500098

6. TASSEL:

NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

1 = < 30°

2 = 30-40°

3 = > 45°

Penduncle Length:

CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

1 = LIGHT (WF9)

2 = MEDIUM

3 = HEAVY (KY21)

Anther Color:

1 = YELLOW

2 = PINK

3 = RED

4 = PURPLE

5 = GREEN

Glume Color:

6 = OTHER (Specify) _____

Pollen Restoration for Cytoplasm (0 = Not Tested, 1 = Partial, 2 = Good)

"T"

"S"

"C"

OTHER (Specify Cytoplasm and degrees of restoration) _____

7. EAR (Husked Ear Data Except When Stated Otherwise):

CM LENGTH

MM. MID-POINT
DIAMETER

GM. WEIGHT

Kernel Rows:

1 = INDISTINCT

2 = DISTINCT

NUMBER

1 = STRAIGHT

2 = SLIGHTLY CURVED

3 = SPIRAL

Silk Color (Exposed at Silking Stage):

1 = GREEN

2 = PINK

3 = SALMON

4 = RED

Husk Color:

FRESH

1 = LIGHT GREEN

2 = DARK GREEN

3 = PINK

DRY

4 = RED

5 = PURPLE

6 = BUFF

Husk Extension: (Harvest Stage)

1 = SHORT (Ears Exposed)

2 = MEDIUM (Barely Covering Ear)

3 = LONG (8-10CM Beyond Ear Tip)

4 = VERY LONG (> 10 CM)

Husk Leaf:

1 = SHORT (< 8 CM)

2 = MEDIUM (8-15 CM)

3 = LONG (> 15 CM)

Shenk:

CM LONG

NO. OF INTERNODES

Position at Dry Husk Stage:

1 = UPRIGHT

2 = HORIZONTAL

3 = PENDENT

Taper:

1 = SLIGHT

2 = AVERAGE

3 = EXTREME

Drying Time (Unhusked Ear):

1 = SLOW

2 = AVERAGE

3 = FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

MM LONG

MM. WIDE

MM. THICK

Shape Grade (% Rounds)

1 = < 20

2 = 20-40

3 = 40-60

4 = 60-80

5 = > 80

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8. KERNEL (Dried):

Pericarp Color: 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE
 5 = BROWN 6 = LIGHT RED 7 = CHERRY RED
 8 = VARIEGATED (Describe) _____

Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) _____

1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED
 7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) _____

Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH
 5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) _____

GM. WEIGHT /100 SEEDS (Unsize Sample)

9. COB:

MM. DIAMETER AT MID-POINT

Strength: 1 = WEAK 2 = STRONG

Color: 1 = WHITE 2 = PINK 3 = RED 4 = BROWN
5 = VARIEGATED 6 = OTHER (Specify) _____

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

<input type="text" value="0"/> STALK ROT (Diplodia)	<input type="text" value="0"/> STALK ROT (Fusarium)	<input type="text" value="0"/> STALK ROT (Gibberella)
<input type="text" value="0"/> NORTHERN LEAF BLIGHT	<input type="text" value="0"/> SOUTHERN LEAF BLIGHT	<input type="text" value="0"/> SMUT
<input type="text" value="0"/> SOUTHERN RUST	<input type="text" value="0"/> CORN SMUT	<input type="text" value="0"/> BACTERIAL WILT
<input type="text" value="0"/> BACTERIAL LEAF BLIGHT	<input type="text" value="0"/> MAIZE DWARF MOSAIC	<input type="text" value="0"/> STUNT
<input type="text" value="0"/> OTHER (Specify) _____		

11. INSECT RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

<input type="text" value="0"/> CORNBORER	<input type="text" value="0"/> EARWORM	<input type="text" value="0"/> SAPBEETLE	<input type="text" value="0"/> APHID
<input type="text" value="0"/> ROOTWORM (Northern)	<input type="text" value="0"/> ROOTWORM (Western)		
<input type="text" value="0"/> ROOTWORM (Southern)	<input type="text" value="0"/> OTHER (Specify) _____		

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	A632	Kernel Type	A632
Plant Type	CB59G	Quality (Edible)	Not Applicable
Ear Type	CB59G	Usage	CB59G

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.

Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous Authors)

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The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.

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COMMENTS: Heat units we calculated by actual recording, and comparison with two (2) known standards, A632 and A619.

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EXHIBIT D

Objective Description

<u>Tassel Trait</u>	<u>Comments</u>
Tassel Branches:	Horizontal to semi-erect
Tassel Color:	At pollen shed, Rachis is green. Glumes are purple with slight mottling.
Tassel Size:	Medium to medium small, and not necessarily symmetrical.
# Tassel Branches:	4 to 8 irregularly spaced and unevenly lengthed.
Bracht Color:	Yellow or Light green.
Anther Color:	Dark red or maroon
Anther Emergence:	Begins 2/3 the way up central tassel axis and proceeds from upper branches to lower branches.

<u>Ear Traits</u>	
Silk Color:	Consistently pink to red.
Shank Length:	Long, giving the appearance that the ear is just under $\frac{1}{2}$ way up the plant.
Ear Node Height:	$\frac{1}{4}$ to $\frac{1}{3}$ up the plant.
Kernel Size:	Similar to A632, approximately 70% 20/18 Fl. & Rds.
Kernel Color:	Slightly dull yellow-orange with purple or dark colored embryonic pumule visible through the pericarp.
Cob Color:	Dark red.
Ear Leaves:	Usually 1-3, quite small, ($\frac{1}{2}$ to 1 inch) ear leaves.

<u>Plant Traits</u>	
Plant Height:	4 - 6 inches shorter than BEBA and 2 inches shorter than RWAC-48 inches in Hawaii.
Leaf Number:	12 leaves in Hawaii.
Leaf Length:	Medium long, similar to A632.
Leaf Width:	Medium narrow, but not as narrow as A632.
Leaf Angle:	Upper leaves are semi-erect with tips of leaves often flagging. Lower leaves are more horizontal.
Leaf Color:	Dull, but deep olive green, not bright like LOAD. Midrib is distinctly white.
Stalk Color:	Green with sometimes purple mottling-especially under stress.
Stalk Shape:	Medium-small diameter with zig-zag internodes.

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Objective Description con't.

	Plant Traits	Comments
Ear/plant:		$\frac{1}{4}$ of plants have 2nd ear - many plants have 3 ears starting. $\frac{1}{4}$ to $\frac{1}{2}$ of plants would produce a 2nd fair ear.
Seedling Vigor:		Shows considerably purple color under stress, especially water-logging. However, seedling continues to grow well.
Tillering:		About 2% in Hawaii.
Northern Leaf Blight:		Medium resistance; at pollen shed, the leaves showed a fair number of small lesions under conditions of extremely high inoculum.
	Root Traits	
Root Quantity:		High number of small to medium sized brace roots.
Root Color:		Brace roots are dark purple, but when first developed they are bright red.

MORPHOLOGICAL TRAITS

TASSEL: Branches 12-15; open
Glumes reddish purple stripes
Comments
Anthers purple
Pull medium

EAR: Silk Color pink early growth to red later stage
Ear Shoots leafy
Comments multiple ear shoots at node, up to four
Cob Color red

LEAF: Color medium green
Width narrow
Comments wavy; white midrib; long necrotic lesions due to heat stress; purple sheath stain; long leaves
Angle 60°

PLANT: Stalk slender
Comments very symmetrical looking plant
Brace Roots purple; many

PLANT & EAR HEIGHTS

Plot #	AVG	1	2	3	4	5	6	7	8
PLANT	58	64	56	52	57	60	55	58	57
EAR	28	32	26	25	27	29	23	28	36

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EXHIBIT B SUPPORT
App. # 8500098

AGRONOMIC TRAITS

EST YIELD	POLLEN YIELD	EARS/ PLANT	EAR LENGTH	ROWS OF K	% GOOD EARS	GRAMS /EAR	% EMERG	VIGOR RATING	%SL	%RL	%DE
58.9	4.7	1.2	5.0" 13cm	14	93.4	57.4	82.9	6.7	2.8	.1	.2

ENTOMOLOGICAL DATA	ECB1 RATING	ECB2 RATING	CLA RATING
	5.0	4.1	9.0

PATHOLOGICAL DATA

NLB	NLS	SLB	ALB	EYE	YLB	MDMA	MCDV	GW	SW	HOL
-----	-----	-----	-----	-----	-----	------	------	----	----	-----

PHYTOTOXICITY DATA

PHYTOTOXICITY RATING	Bladex Pre	Lasso Pre	Prowl Pre	Buctril Post	Bladex Post	Banvel Post	Basagran Post	Prowl+ Bladex Post	2,4-D Post
	.3	1.0	1.0	1.3	1.7	1.3	2.3	1.0	2.0
PLANT HEIGHT	27.0	26.3	25.0	24.3	21.7	22.7	21.0	23.7	19.7
POLLEN DATE	76.3	76.3	76.7	78.3	78.3	78.7	78.3	78.3	79.0
SILK DATE	73.7	74.0	74.3	76.3	76.3	76.3	75.3	75.0	74.7

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EXHIBIT B SUPPORT
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FLOWERING DATA

Loc.	P10	HUP10	P50	HUP50	P90	HUP90	P90-P10	HU(P90-P10)	S10	HUS10	S50	HUS50	S90	HUS90	S90-S10	HU(S90-S10)	BL	HUBL	BLH20
1	54.0	1332	56.5	1383	59.0	1435	5.0	103	59.5	1447	61.5	1496	65.0	1586	5.5	139	103	2457	27
2	62.0		63.3		65.0		3.0		64.0		65.0		66.5		2.5		116		
3	73.7	1233	75.3	1277	79.3	1372	5.6	139	76.8	1313	79.3	1372	81.5	1418	4.7	105	126	2382	
4	73.0		74.8		79.3		6.3		73.3		75.3		77.3		4.0		117		
5	71.3	1396	72.5	1419	73.3	1445	2.0	49			74.5	1472					132	2424	33
6	57.0		59.0		61.0		4.0		59.5		61.0		62.0		2.5		108		
7	62.0	1228	63.8	1270	68.3	1391	6.3	163	63.3	1257	65.0	1303	67.0	1358	3.8	101			
8	60.5		61.8		66.8		6.3		63.0		64.3		66.3		3.3				
AVG	64.2	1297	65.8	1337	69.0	1411	4.8	113	65.4	1339	68.6	1423	69.0	1454	3.6	115	117	2421	30

SHAKEOUT DATA

	TOTAL	RS	15	16	17	18	19	20	21	22	23	24	25
ROUND	42.4		1.1	2.3	4.2	6.3	8.8	8.9	7.0	2.9	.7	.1	0
FLAT	54.1		1.4	2.3	5.3	7.5	10.9	11.5	9.8	4.0	1.1	.1	0
TOTAL	96.5	2.6	2.5	4.6	9.5	13.8	19.7	20.4	16.8	6.9	1.8	.2	0

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MORPHOLOGICAL TRAITS

EXHIBIT B SUPPORT
App. # 8500098

TASSEL: Branches 12-18; spread out
Glumes purple
Comments
Anthers purple
Pull easy to medium

EAR: Silk Color variable yellow - pink - red
Ear Shoots leafy
Comments multiple ear shoots at a node; upright ear
Cob Color red

LEAF: Color dark green
Width medium-wide
Comments bright yellow midrib; sturdy structure
Angle 50°

PLANT: Stalk sturdy medium structure
Comments nice looking plant;
Brace Roots green

PLANT & EAR HEIGHTS

Plot #	AVG	1	2	3	4	5	6	7	8
PLANT	57	60	54	53	58	60	56	57	55
EAR	26	28	24	24	24	26	22	26	30

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T/H 85/100/10

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AGRONOMIC TRAITS

EXHIBIT B SUPPORT
App. # 8500098

Est Yield	Pollen Yield	Ears/ Plant	Ear Length	Rows Of K	% Good Ears	Grams /Ear	% Emerg	Vigor Rating	%SL	%RL	%DE
57.6	6.6	1.1	5.5"	12-14	95.4	59.5	76.5	5.6	3.6	.4	1.1

14CM R/S

ENTOMOLOGICAL DATA

ECB1 Rating	ECB2 Rating	CLA Rating
4.5	3.5	9.0

PATHOLOGICAL DATA

NLB	NLS	SLB	ALB	EYE	YLB	MDMA	MCDV	GW	SW	HOL
								6.5		

PHYTOTOXICITY DATA

Bladex Pre	Lasso Pre	Prowl Pre	Buctril Post	Bladex Post	Banvel Post	Basagran Post	Prowl+ Bladex Post	2,4-D Post

PHYTOTOXICITY RATING

PLANT HEIGHT

POLLEN DATE

SILK DATE

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FLOWERING DATA

EXHIBIT B SUPPORT
App. # 8500098

Loc.	P10	HUP10	P50	HUP50	P90	HUP90	P90-P10	HU(P90-P10)	S10	HUS10	S50	HUS50	S90	HUS90	S90-S10	BL	HUBL	BLH20
1	58.5	1424	59.5	1447	60.8	1478	2.3	54	60.5	1472	62.5	1522	64.5	1572	4.0	100	2663	27
2	63.8		64.8		66.8		3.0		65.5		66.3		68.0		2.5	121		
3	75.5	1284	77.0	1326	82.8	1439	7.3	155	76.5	1314	79.0	1367	81.5	1410	5.0	96	2404	
4	73.8		76.0		80.3		6.5		75.0		77.3		80.0		5.0	124		
5	74.0	1472	75.8	1500	77.0	1555	3.0	83			76.0	1527				134	2433	35
6	60.3		61.3		62.5		2.3		61.3		62.5		64.0		2.8	113		
7	63.5	1262	65.3	1309	70.5	1453	7.0	191	64.0	1276	65.8	1323	68.3	1392	4.3	116		
8	63.0		64.3		69.3		6.3		63.8		65.0		67.3		3.5			
AVG	66.5	1361	68.0	1396	71.2	1481	4.7	121	66.3	1354	69.6	1453	70.1	1458	3.8	104	2500	31

SHAKEOUT DATA

	TOTAL	RS	15	16	17	18	19	20	21	22	23	24	25
ROUND	41.8		1.4	3.3	6.0	8.2	10.1	8.0	3.8	.8	.1	0	0
FLAT	55.9		1.5	2.7	7.1	10.9	14.8	12.2	5.6	1.1	.1	0	0
TOTAL	97.7	2.2	2.9	6.0	13.1	19.1	24.9	20.2	9.4	1.9	.2	0	0

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EXHIBIT E

Statement of Ownership

The original plant was personally selected by M.T. Madson while rogueing sorghum fields in Kansas. He returned the seed to Minnesota and worked on and off with it until 1979, when he felt he had stabilized and cleaned it up; all of this was done on his own farm.

In 1982 when Quality Seed Associates, Inc., was organized he came to work for us continuing his plant breeding program, while serving as a production manager for Quality Seed Associates, Inc.

In 1983 Quality Seed Associates, Inc., formed a partnership with Milo T. Madson called Quality Research Associates for the purpose of marketing any developed lines.

Quality Research Associates, which is Quality Seed Associates, Inc., and Mr. Milo Madson are the principles and owners of the line for which application is being made.